

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,979,374 B2
APPLICATION NO. : 09/871600
DATED : December 27, 2005
INVENTOR(S) : Arai et al.

Page 1 of 4

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, Item (56) References Cited

Other Publication Reference No. 4, "Change, W.C. et al." should be --Chang, W.C. et al.--.

Column 10

Line 12, Should "strontium tinanate" should be --strontium titanate--

Column 12

Line 10, "reduce" should be --reduced--.

Column 12

Line 12, "60" should be --80--.

Column 12

Line 41, "In" should be --in--.

Column 14

Line 42, After "should" insert --be--.

Column 16

Line 64, "(in" should be --in--.

Column 17

Line 29, "s" should be --a--.

Column 17

Line 30, "reached" should be --reach--.

Column 17

Lines 63-64, "(BH)max" should be --(BH)_{max}--.

Column 18

Line 38, "R_{CJ}" should be --H_{CJ}--.

Column 20

Line 8, "W_{a03}" should be --W₀₃--.

Column 20

Table 2, Line 2, Col. 6, "(BH)_{max}/ρ₂" should be --(BH)_{max}/P²--.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Columns 20-22

Lines 44-34, Delete Claims 1-18 and insert:

-- 1. A magnetic powder comprising:
an alloy composition represented by $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$ (where R is at least one rare-earth element selected from the group consisting of Nd and Pr, a ratio of Pr with respect to a total mass of R is in the range of 20-60%, M is at least one element selected from Ti, Cr, Nb, Mo, Hf, W, Mn, and Zr, x is 7.1 – 9.9 at%, y is 4.6 – 8.0 at%, z is 0.1 – 3.0 at %, and a is 0 – 0.30);

wherein the magnetic powder further comprises a composite structure having a soft magnetic phase and a hard magnetic phase;

an average particle size of the magnetic powder is 1-50 μm ; and

when the magnetic powder is mixed with a binding resin and then the mixture is subjected to compaction molding to form a bonded magnet having a density $\rho [Mg/m^3]$, a maximum magnetic energy product $(BH)_{max}[kJ/m^3]$ of the bonded magnet at room temperature satisfies the relationship represented by the formula of $(BH)_{max}/\rho^2[x10^{-9}J\cdot m^3/g^2] \geq 2.40$, and the intrinsic coercive force H_{CJ} of the bonded magnet at room temperature is in the range of 430 – 750 kA/m.

2. The magnetic powder as claimed in claim 1, wherein the remanent magnetic flux density $Br[T]$ of the bonded magnet at room temperature satisfies the relationship represented by the formula of $Br/\rho[x10^{-6}T\cdot m^3/g] \geq 0.125$.

3. A magnetic powder comprising:

an alloy composition represented by $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$ (where R is at least one rare-earth element selected from the group consisting of Nd and Pr, a ratio of Pr with respect to a total mass of R is in the range of 20-60%, M is at least one element selected from Ti, Cr, Nb, Mo, Hf, W, Mn, and Zr, x is 7.1 – 9.9 at%, y is 4.6 – 8.0 at%, z is 0.1 – 3.0 at %, and a is 0 – 0.30);

wherein the magnetic powder further comprises a composite structure having a soft magnetic phase and a hard magnetic phase;

an average particle size of the magnetic powder is 1-50 μm ; and

when the magnetic powder is mixed with a binding resin and then the mixture is subjected to compaction molding to form a bonded magnet having a density $\rho [Mg/m^3]$, a remanent magnetic flux density $Br[T]$ of the bonded magnet at a room temperature satisfies the relationship represented by the formula of $Br/\rho [x10^{-6}T\cdot m^3/g] \geq 0.125$ and the intrinsic coercive force H_{CJ} of the bonded magnet at room temperature is in the range of 430 – 750 kA/m.

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4. The magnetic powder as claimed in claim 1, wherein the magnetic powder has been obtained by milling a melt spun ribbon.
5. The magnetic powder as claimed in claim 4, wherein the thickness of the melt spun ribbon is 10 -40 μ m.
6. The magnetic powder as claimed in claim 4, wherein the melt spun ribbon has been obtained by colliding a molten alloy of a magnetic material onto a circumferential surface of a cooling roll which is rotating to cool and then solidify the molten alloy.
7. The magnetic powder as claimed in claim 6, wherein the cooling roll includes a roll base made of a metal or an alloy and an outer surface layer provided on an outer peripheral portion of the roll base to constitute the circumferential surface, in which the outer surface layer of the cooling roll has a heat conductivity lower than the heat conductivity of the roll base.
8. The magnetic powder as claimed in claim 7, wherein the outer surface layer of the cooling roll is formed of a ceramic.
9. The magnetic powder as claimed in claim 1, wherein the magnetic powder has been subjected to a heat treatment at least once during the manufacturing process or after the manufacture of the magnetic powder.
10. The magnetic powder as claimed in claim 1, wherein the mean crystal grain size of the magnetic powder is 5 – 50nm.
11. The magnetic powder as claimed in claim 3, wherein the magnetic powder has been obtained by milling a melt spun ribbon.
12. The magnetic powder as claimed in claim 3, wherein the thickness of the melt spun ribbon is 10 - 40 μ m.
13. The magnetic powder as claimed in claim 11, wherein the melt spun ribbon has been obtained by colliding a molten alloy of a magnetic material onto a circumferential surface of a cooling roll which is rotating to cool and then solidify the molten alloy.

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14. The magnetic powder as claimed in claim 13, wherein the cooling roll includes a roll base made of a metal or alloy and an outer surface layer provided on an outer peripheral portion of the roll base to constitute the circumferential surface, in which the outer surface layer of the cooling roll has a heat conductivity lower than the heat conductivity of the roll base.

15. The magnetic powder as claimed in claim 14, wherein the outer surface layer of the cooling roll is formed of a ceramic.

16. The magnetic powder as claimed in claim 3, wherein the magnetic powder is constituted from a composite structure having a soft magnetic phase and a hard magnetic phase.

17. The magnetic powder as claimed in claim 3, wherein the magnetic powder has been subjected to a heat treatment at least once during the manufacturing process or after the manufacture of the magnetic powder.

18. The magnetic powder as claimed in claim 3, wherein the mean crystal grain size of the magnetic powder is 5 – 50nm.--

Signed and Sealed this

Twenty-ninth Day of May, 2007



JON W. DUDAS
Director of the United States Patent and Trademark Office